

for

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Signature

✓ A METHOD FOR ENTERING DATA INTO A COMPUTER USING A  
PERIPHERAL INPUT DEVICE WITH A RETRACTABLE CORD

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

5 This invention relates generally to a peripheral input/output device and more particularly, to a method for entering data into a computer using peripheral input device with a retractable cord.

2. DESCRIPTION OF THE RELATED ART

10 People typically interface with computers using a variety of peripheral input devices. A computer therefore commonly is equipped with one or more of a keyboard, a touch pad, a joystick, and/or a mouse. Such peripheral input devices typically are equipped with rather long electrical cords to provide flexibility for the computer's user. This flexibility is useful both for configuring the computer equipment for operation and for operating the peripheral devices.

15 The length of the electrical cord sometimes causes problems. Consider, for instance, a keyboard with a long cord permitting the user to sit at a location somewhat removed from the computer chassis. The cord is played out to permit the user to sit at a distance and, if the user moves closer to the computer, the slack in the cord can become bothersome and the user might have to divert their  
20 attention to removing the slack from the immediate work area. The diversion

hampers productivity by occupying the user's attention and time and, sometimes, by interrupting the user's train of thought.

The problem may be exacerbated when using a mouse. As the mouse is moved over the desktop to position a pointer or cursor on the screen, the electrical cord is played out and, sometimes, slackened. The slack cord may then actually interfere with using the mouse by occupying desktop over which the mouse must be moved. The slack cord problem is further complicated for a mouse in that the slack will probably be needed very quickly to reposition the mouse. The option of simply stopping and removing the slack is therefore much less palatable.

Thus, there is a need for a new mechanism for managing the slack in the electrical cord of a peripheral input device. The present invention is directed to overcoming, or at least reducing the effects of, one or more of the problems set forth above.

### **SUMMARY OF THE INVENTION**

The invention, in one embodiment, is a method for entering data into a computer. The method includes anchoring an electrical cord connecting a peripheral input device to the computer, positioning the peripheral input device, and retracting slack in the electrical cord as the peripheral input device is positioned.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Figures 1A-1B illustrate a first embodiment of a peripheral input device constructed and operated in accordance with the present invention;

5           Figures 2A and 2B depict variations on the embodiment of Figures 1A-1B;

Figures 3-4 illustrate a second embodiment also constructed and operated in accordance with the present invention;

Figure 5 illustrates a third embodiment also constructed and operated in accordance with the present invention;

10           Figures 6-7 depict, in an exploded and an assembled view, respectively, one embodiment of a spool such as may be employed in accordance with the present invention;

Figure 8 depicts how the spool of Figures 6-7 may be employed in the embodiment of Figures 3-4; and

15           Figure 9 depicts a spool alternative to that in Figures 6-8 .

20           While the invention is susceptible to various modifications and alternative forms, specific embodiments thereof have been shown by way of example in the drawings and are herein described in detail. It should be understood, however, that the description herein of specific embodiments is not intended to limit the invention to the particular forms disclosed, but on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

## **DETAILED DESCRIPTION OF SPECIFIC EMBODIMENTS**

Illustrative embodiments of the invention are described below. In the interest of clarity, not all features of an actual implementation are described in this specification. It will of course be appreciated that in the development of any such actual embodiment, numerous implementation-specific decisions must be made to achieve the developers' specific goals, such as compliance with system-related and business-related constraints, which will vary from one implementation to another. Moreover, it will be appreciated that such a development effort, even if complex and time-consuming, would nevertheless be a routine undertaking for those of ordinary skill in the art having the benefit of this disclosure.

### **A First Embodiment of a Peripheral Input Device Having a Retractable Cord**

Figures 1A-1B illustrate a first embodiment of a peripheral input device constructed and operated in accordance with the present invention. The device includes a body 12, an electrical cord 14 operably connected to the body 12, an anchor 16 for the electrical cord 14, and a spool 18 biased to rotate and retract the electrical cord 14 as discussed more fully below relative to Figures 6-7. In the particular embodiment illustrated, the spool 18 is rotatably mounted in the housing 19 of the anchor 16. Note, however, that the spool 18 need not necessarily be mounted in the anchor 16 to practice the invention as illustrated by the embodiment of Figures 3-4 discussed below. Further, in some embodiments not shown, the housing 19 might be sufficiently large to house the body 12 when not in use and the electrical cord 14 is fully retracted.

The anchor 16 in the embodiment of Figures 1A-1B is affixed to the desktop 20. The manner in which the anchor 16 is affixed is not material to the invention provided the anchor 16 is sufficiently affixed so that the user may draw the cord 14 from the spool 18 while normally operating the input device 10.

Thus, the anchor 16 may be affixed by an adhesive or a fastener. In one particular embodiment, the anchor 16 is affixed using a flexible hook-and-loop fastener (not shown) such as that sold under the mark Velcro<sup>®</sup>. One strip of the fastener may be adhered to the bottom of the anchor 16 and the other to the desktop 20.

The housing 19 in the embodiment of Figures 1A-1B is affixed to the desktop 20 in a manner permitting the housing 19 to rotate in a horizontal plane as shown in Figure 1B. More particularly, the housing 19 is rotatably mounted to a base 21 that is affixed to the desktop 20. However, this is not necessary to the practice of the invention. The housing 19 may, in some alternative embodiments, be rigidly affixed to the desktop 20 in a manner prohibiting such lateral rotation.

Figure 2A illustrates one variation of the embodiment of Figures 1A-1B in which the anchor 16 is affixed to the chassis of the computer 22. This particular embodiment also provides rotation in a horizontal plane about the axis 24 as the housing 19 of the anchor 16 is rotatably mounted to the bracket 26 by which the anchor 16 is affixed to the computer 22. Thus, this embodiment provides some flexibility in positioning the anchor 16 while still anchoring the electrical cord 14.

Figure 2B illustrates a second variation on the embodiment of Figures 1A-1B in which the anchor 16 is affixed to the mouse pad 30. In some embodiments, this variation may include a housing 19 rotatable in a horizontal plane in a manner similar to the embodiment of Figure 1B. The anchor 16 may also be affixed to the desktop 20 through the mouse pad 30 such that the anchor is affixed to both the desktop 20 and the mouse pad 30 in some embodiments. Note that the desired manner of affixation may vary depending on whether the anchor 16 is affixed to the mouse pad 30 as shown in Figure 2B, to the chassis of the computer 22 as shown in Figure 2A, or the desktop 20 as shown in Figures 1A-1B.

Returning to Figures 1A-1B, the peripheral input device 10 furthermore includes an input mechanism 28 on the body 12. The device 10 in this particular embodiment is a mouse, and so the input mechanism includes two buttons on the top of the body 12 and a trackball (not shown). The construction and operation of the body 12 and the input mechanism 28 in this particular embodiment is the same as for a conventional mouse. Thus, the construction and operation of the body 12 and input mechanism 28 will be well known to those in the art having the benefit of this disclosure. Note, also, that some embodiments in which the input device 10 is a mouse a mouse pad 30 might be employed.

#### **A Second Embodiment of a Peripheral Input Device Having a Retractable Cord**

Figures 3-4 illustrate a second embodiment 50a constructed and operated in accordance with the present invention. In this particular embodiment, the spool

18 is mounted within the body 12a of the device 50a rather than in the anchor 16a. The device 50a is otherwise analogous to the device 10 of Figures 1A-2, with like parts bearing like numbers. Again, the particular embodiment 50a illustrated in Figures 3-4 is a mouse. The body 12a must be modified relative to that of a conventional mouse to rotatably mount the spool 18 therein as discussed more fully below.

The body 12a is otherwise constructed in accordance with a conventional mouse design. Thus, the mouse 12a includes, as an input mechanism 28, the buttons and the trackball 29. The buttons are biased in the upward direction and are depressed by the user to input data. The trackball 29 is rotatably mounted in the body 12a and extends through an aperture in the bottom of the body 12a. The body 12a also houses electro-mechanical circuitry to convert the trackball's movement into electronic data in a manner well known to the art. The operation of this input mechanism in this particular embodiment is well known and appears in such elementary texts as David Macaulay, *The Way Things Work*, pp. 346-47 (Houghton Mifflin Co. 1988) (ISBN 0-395-42857-2) and Ron White, *How a Computer Works*, pp. 106-09 (Ziff-Davis Press 2d Ed. 1993) (ISBN 1-56276-344-X).

### **A Third Embodiment of a Peripheral Input Device Having a Retractable Cord**

Figure 5 illustrates a third embodiment 50b constructed and operated in accordance with the present invention. In this particular embodiment, the spool



18 is mounted within housing 19 rather than in the anchor 16a or the body 12. The anchor 16a is affixed to the desktop 20, but the housing 19a "floats" in that it is not affixed to desktop 20 or mouse pad 30. The device 50b is otherwise analogous to the device 10 of Figures 1A-2B and the device 50a of Figures 3-4, with like parts bearing like numbers. Again, the particular embodiment 50b illustrated in Figure 5 is a mouse, but the invention is not so limited. Note also that the electrical cord 14 could be anchored at the back of the computer 22, thereby eliminating the need for anchor 16a.

#### **A Spooling Mechanism as May be Used in the Above Embodiments of the Peripheral Input Device**

Figures 6-8 and Figure 9 illustrate spooling mechanisms as may be used to retract the electrical cord 14 as set forth above. More particularly, Figures 6-7 depict, in an exploded and an assembled view, respectively, one embodiment 18 of a spool such as may be employed in accordance with the present invention. Figure 8 depicts how the spool 18 of Figures 6-7 may be employed in the embodiment of Figures 3-4. Figure 9 depicts a spool alternative 18a to that in Figures 6-8.

Turning now to Figures 6-7, a first embodiment of the spool 18 is shown. The spool 18 includes a drum 52 rotatably mounted on a shaft 53 affixed to a stand 54 on one end, as shown in Figure 6 , and the side of a structure 63, as shown in Figure 7 . If the spool 18 is employed in the embodiment of Figures

1A-1B, the structure 63 is the housing 19. If the spool 18 is employed in the embodiment of Figures 3-4, then the structure 63 is the body 12a.

Each end of the shaft 53 may be affixed by a fastener 60 through an aperture 58 in the stand 54 and in the structure 63 such that the shaft 53 does not rotate. However, both ends of the shaft 53 are supported by a respective stand 54 and, in some embodiments, both ends of the shaft 53 may be affixed to a stand 54. The stands 54 are affixed to the base 62 of the structure 63, which is the housing 19 in the embodiment of Figures 1A-1B or the body 12a for the embodiment of Figures 3-4.

Referring now to Figure 6 , one end 64 of the shaft 53 extends also through a clock spring 66 and a cover 68 before being secured to the stand 54 by the fastener 60. A tab 70 at one end of the clock spring 66 inserts into a slot 72 in the drum 52 and a tab 74 at the other end of the clock spring 66 insert into a slot 76 in the shaft 53. The cover 68 encloses the clock spring 66 is mounted to the drum 52 by inserting a plurality of tabs 78 extending from the cover 68 into slots 80 in the drum 52.

The clock spring 66 biases the spool 18 to retract the electrical cord 14 and operates between the drum 52 and the shaft 53. As the mouse 12 is drawn with sufficient force, the electrical cord 14 spools off the drum 52 and tensions the clock spring 66. When the mouse 12 is released or when insufficient force is exerted through the mouse 12, the tension in the clock spring 66 is released and

rotates the drum 52 on the stationary shaft 53 to retract the electrical cord 14. Thus, the workspace is freed of any undesirable slack in the electrical cord 14. Note that some embodiments not shown might employ a ratchet to control the retraction of the electrical cord 14.

Referring now to Figure 7 , a second end 81 of the stationary shaft 53 extends through an aperture 82 in a contact plate 84 before it is affixed to the structure 63. The contact plate 84 includes contact elements 86 that are electrically coupled to the contact rings 88 on the corresponding end of the drum 52 when the spool 18 is assembled. When the spool 18 is employed in the embodiment of Figures 1A-1B, the contact elements 86 are also electrically coupled to the male connector 90 that mates with the female connector 92. When the spool 18 is employed in the embodiment of Figures 3-4, the contact elements 86 are electrically coupled to the leads 94 which may be directly routed to the electrical circuitry.

The use of the contact elements 86 and the contact rings 88 thereby maintains the electrical continuity of the signal path between the mouse 12, or 12a, and the computer 22 while enabling the drum 52 to rotate freely about the stationary shaft 53. Figures 1A-1B illustrate how the spool 18 might be mounted in that particular embodiment using the coupling between the male connector 90 and the female connector 92. Figure 8 illustrates how the spool 18 might be housed in the mouse 12a of Figures 3-4 such that the lead 94 are routed to the electro-mechanical elements 96.

Finally, Figure 9 illustrates an alternative spool 18a in which the drum rotates in a horizontal plane rather than the vertical plane of Figures 6-8. This particular embodiment is otherwise similar to that of Figures 6-8. Still other techniques might be used to retract and spool the electrical cord 14.

5      **A Method for Inputting Data Into a Computer Using a Peripheral Input Device Having a Retractable Cord**

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10      A peripheral input device having a retractable cord, such as the device 10 of Figures 1A-1B or the device 50 of Figures 3-4, may be used to enter data into a computer. Referring now to Figures 1A-1B for illustrative purposes, the device 10 may be so used by first anchoring the electrical cord 14 connecting the body 12 of the peripheral input device 10 to the computer 22. The body 12 of the peripheral input device 10 may then be positioned by the user. As the body 12 of the peripheral input device 10 is positioned, the slack in the electrical cord 14 is retracted.

15      Anchoring the electrical cord includes anchoring the electrical cord to a work surface such as the desktop 20, the mouse pad 30, or both the desk top 20 and the mouse pad 30. The electrical cord 14 may alternatively be anchored to the chassis of the computer 22 as in the embodiment of Figure 2A or in some other suitable manner. The anchor 16 by which the electrical cord 14 is anchored in the  
20      particular embodiment of Figures 1A-1B may be affixed in any suitable manner as discussed above, including, but not limited to, adherence, fastening, or both.

In the particular embodiment of Figures 1A-1B, the peripheral input device 10 is a mouse. Consequently, positioning the peripheral input device 10 includes positioning a mouse and, typically, positioning a cursor 98 displayed on the monitor 97 of the computer 22. However, the invention is not so limited as the invention may be used with other types of peripheral input devices. An exemplary alternative type of peripheral input device is a keyboard, although other types may be suitable.

Retracting slack in the electrical cord 14 is also highly implementation dependent. The slack may be retracted into the peripheral input device as in the case of the embodiment in Figures 1A-1B. The slack may alternatively be retracted into an anchor as with the embodiment of Figures 3-4 or into a floating structure as in the embodiment of Figure 5. Still other suitable alternatives might be employed.

#### Remarks

The particular embodiments disclosed above are illustrative only, as the invention may be modified and practiced in different but equivalent manners apparent to those skilled in the art having the benefit of the teachings herein. For example, the input mechanism may vary depending on the particular implementation of the invention. A keyboard, for example, has a plurality of buttons, generally referred to as "keys," biased in an upward direction but typically not a trackball. However, some keyboards do include trackballs and/or joysticks. Furthermore, a joystick will have a different input mechanism from

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